Mission Directorate: Education

Overview

NASA has engaged students and teachers in its engineering challenges and scientific discoveries since its inception. From school presentations to seeds flown in space, from filmstrips and posters to podcasts and virtual tours through the galaxies, NASA's education programs have fostered inquiry, built curiosity, and encouraged innovation. Generations of Americans have participated in NASA's science, technology, engineering, and mathematics (STEM) education programs, and thereby learned basic skills, discovered new career paths, and developed interests in emerging academic disciplines. The FY 2012 budget provides NASA with the resources necessary to continue this rich tradition in STEM education through support for the Nation's students and educators, the leveraging of cutting-edge education technologies, and partnerships with industry.

In 2010, NASA chartered an Education Design Team (EDT) to develop a strategy to improve NASA's education offerings, assist in establishing goals, structures, processes, and evaluative techniques to implement new sustainable and innovative STEM education programs. EDT has completed its task, and its recommendations are reflected in the FY 2012 education budget.

Meeting Stakeholder Needs: NASA works with professional organizations, academia, and state/local education providers to identify and address needs in STEM education. Quality professional development for STEM educators is a prevalent need. Through the education staff at NASA's Centers, NASA works cooperatively with states and school districts to identify content needs and opportunities, and with university partners to ensure that NASA investments will be effective in improving teaching practice. NASA also works through communities of practice to identify content areas and special events that supplement informal education programming offered by museums and science centers. NASA higher education efforts increasingly target community colleges, which generally serve a high proportion of minority students. NASA programs build student STEM ability, preparing students for study at a four-year institution. Competitive opportunities support initiatives like the President's "Race to the Top" and the Department of Education's "Star Project," which promote state-based education reform and identify replicable strategies for improving K-12 education.

Leveraging Relationships: NASA pursues strategic partnerships with intergovernmental, academic, industrial, entrepreneurial, and international communities. Partnerships and collaborations with NASA's education programs define specific benefits and outcomes, leverage the expertise of each organization, and share resources, including funding, distribution networks, and media representation. Presidential initiatives like "Educate to Innovate" and "Change the Equation" capitalize on the knowledge and expertise of the Nation's aerospace industry to support the development of a future STEM workforce. NASA investment in the National Space Grant College and Fellowship Program (Space Grant) takes this approach a step further, by supporting state-based consortia of academia, industry, and education organizations. In total, Space Grant actively engages more than 850 institutions in providing work and study experiences in the aeronautics, aerospace, and related sciences.

Inclusion of All Learners: The Administration has numerous initiatives to promote equal access to education opportunities. The White House Council on Women and Girls has established STEM education and careers as a priority area. Recent legislation promotes increased STEM engagement of Hispanic students. NASA's long-standing practice of ensuring inclusiveness of all, regardless of race, ethnicity, gender, disability, or other demographic, is in harmony with these priorities. Performance reports from higher education programs indicate that participation of racial/ethnic minorities and women exceed benchmarks for national enrollments (see Relevance section for reference).

Performance, Accountability, and Transparency: The Office of Education is committed to ensuring that its education opportunities, products, and services are high quality, effective, responsive to customer needs, and efficiently managed. In recent years, NASA's performance ratings in education have risen,

as the Agency has invested more in the evaluation of its education programs and has built better tools to collect performance data (http://www.expectmore.gov). Additionally, NASA routinely seeks opportunities to eliminate redundancies and improve the reach of its programs. Federal working groups, such as the Federal Interagency Committee on Education and the National Science and Technology Council Subcommittee on Education, allow agencies to share successes and best practices, to identify common infrastructures and programs to reduce inter-agency competition, and to leverage resources for best return on taxpayer dollar. Results of studies, assessments, evaluations, and Federal performance ratings are all publicly available in accordance with the Administration's emphasis in sharing results with the public and honoring the public trust (http://www.nasa.gov/news/budget/index.html and http://www.nasa.gov/offices/education/performance/index.html).

The Agency is also increasing the transparency and interaction between Government and the public by soliciting public opinion on education planning decisions. Tools and strategies, like OpenGov and social networks, have allowed the Agency to "test drive" new ideas and possible activities assessing public reaction and comments in order to better align investments to the interests of students, teachers, and the public.

NASA is uniquely positioned to inspire students to be future scientists, engineers, explorers, and educators.

FY 2012 Budget Request

Budget Authority ($ millions)	FY 2010	Ann CR. FY 2011	Auth Act FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016
FY 2012 President's Budget Request	**180.1**	**182.5**	**145.8**	**138.4**	**138.4**	**138.4**	**138.4**	**138.4**
Education	180.1	-	-	138.4	138.4	138.4	138.4	138.4

Note:
The FY 2011 appropriation for NASA was not enacted at the time that the FY 2012 Request was prepared; therefore, NASA is operating under a Continuing Resolution (P.L. 111-242, as amended). Amounts in the "Ann. CR FY 2011" column reflect the annualized level provided by the Continuing Resolution.

The "Auth. Act FY 2011" column represents FY 2011 authorized funding from the NASA Authorization Act of 2010 (P.L. 111-267).

In accordance with the President's proposal to implement a five-year non-security discretionary spending freeze, budget figures shown for years after FY 2012 are notional and do not represent policy. Funding decisions will be made on a year-by-year basis.

Plans for FY 2012

Education

Education

New Initiatives:

In FY 2012, NASA will implement the recommendations from EDT:

- Increase NASA's impact on STEM education by further focusing K-12 efforts on middle school pre- and in-service educator professional development;

- Increase emphasis on providing experiential opportunities for students, internships, and scholarships for high school and undergraduate students;

- Increase NASA's role in national and state STEM policy discussions;

- Emphasize evaluation and assessment, including external independent evaluation, to ensure that investments are providing desirable STEM impacts;

- Engage strategic partners with common objectives and complementary resources and approaches; and

- Use NASA's unique missions, discoveries, and assets (e.g., people, facilities, education infrastructures) to inspire student achievement and educator teaching ability in STEM fields.

Major Changes:

The President's budget reflects a $7.4 million decrease from previous request, consistent with the Administration's effort to reduce federal spending. NASA's Office of Education will focus its funds on existing commitments and grant renewals, continuation of scholarships, internships and fellowships, and activities that directly serve educators, students, and the general public. The decrease will be managed by reducing the number of new grant awards and seeking operational efficiencies (e.g., increased use of education technologies, reduction in printing/warehousing/shipping costs, reducing travel, coordinating solicitations).

Major Highlights for FY 2012

In FY 2012, NASA will pursue several education activities:

- Support national STEM improvement efforts championed by the Administration and led by the Department of Education. Focused, combined goals and solicitation opportunities will result in effective Federal agency contributions. Possible examples include, providing competitions and challenges for students, supporting clearinghouses of Federal STEM education resources, and providing high quality professional development to educators.

- Continue the Summer of Innovation (SoI) activity to inspire student achievement in STEM fields by partnering with internal and external stakeholders to leverage the excitement of NASA's missions. SoI will deepen and broaden the efforts of community and school-based organizations to engage students by providing high quality, inquiry-based content, customized support, and access to NASA people, facilities, and education technologies.

- Enable student launch initiatives, hands-on payload development, and engineering opportunities for NASA missions. Through partnerships with NASA Centers, universities, and industry, students will gain research experiences and hands-on engineering experience on a variety of real-world platforms that may include high-altitude balloons, sounding rockets, aircraft, space satellites, and the International Space Station (ISS).

- Improve STEM education coordination with other Federal agencies and seek opportunities to incorporate NASA content into the STEM education efforts of other Federal programs.

- Increase community college involvement in NASA research, and increase their ability to use NASA content to provide the education and training that will prepare students for jobs in the 21st century.

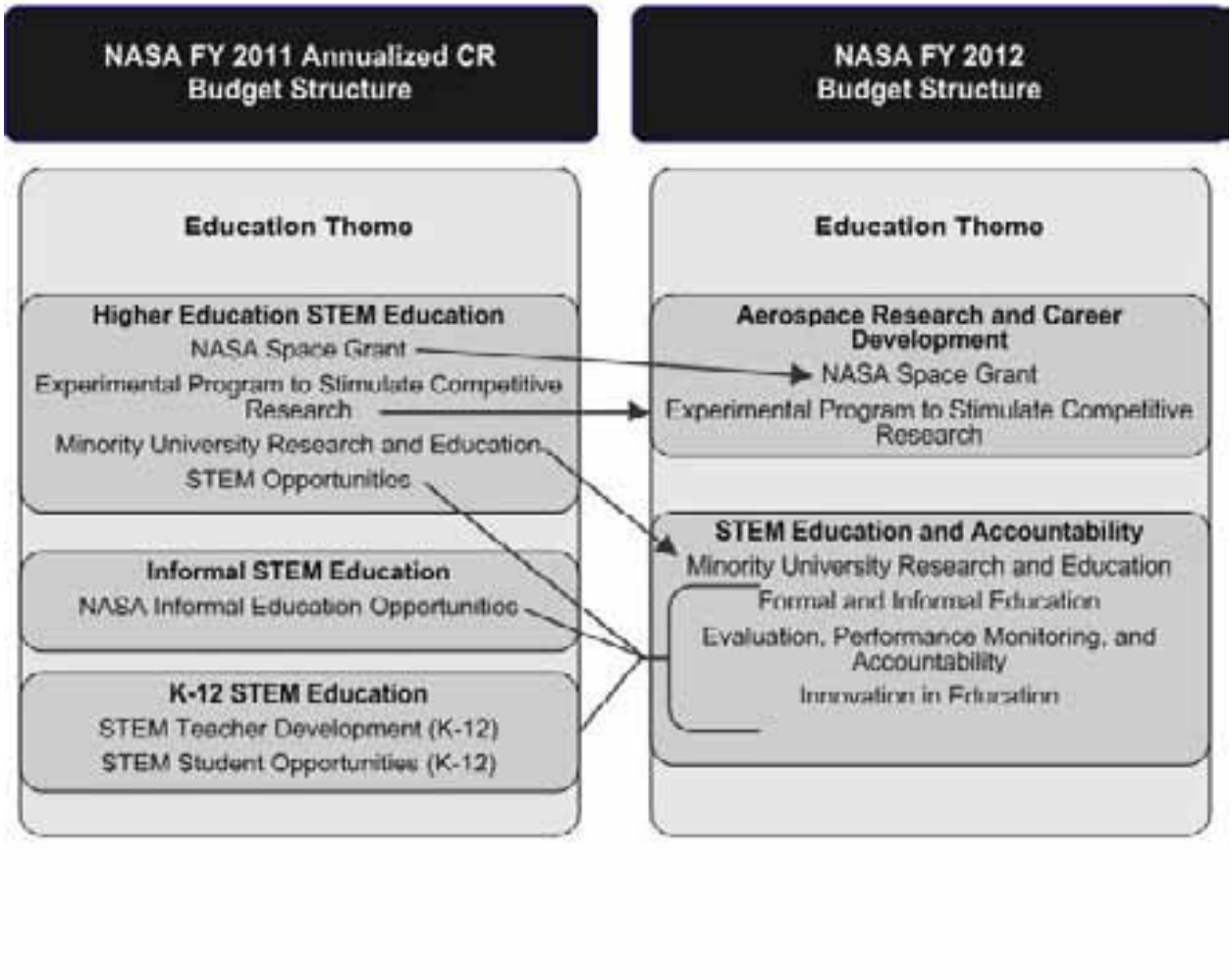
- Expand educator professional development and pre-service preparation that is based on education research and that reflects current and future NASA science and exploration missions.

- Immerse educators in current NASA science and technology by increasing use of education technologies (e-Education) and cyber-learning opportunities.

- Leverage the national, state, and local resources and networks of the Space Grant consortia in implementing these activities.

Mission Directorate Budget Structure Adjustments

In FY 2012, NASA is reorganizing its Education budget in order to provide better emphasis on achieving the Agency's goals. Rather than organizing investments around the type of client served (higher education, K-12 or informal education), NASA is focusing programs on the outcomes that the Agency seeks to achieve. This change will enhance the Agency's ability to leverage other resources. The new structure clusters activities that provide a progression of opportunities for students and/or educators into two program areas. Specifically, the structure of the programs from FY 2011 to FY 2012 is as shown in the figure below.



Theme Overview

FY 2012 Budget Request

Budget Authority ($ millions)	FY 2010	Ann CR. FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016
FY 2012 President's Budget Request	**180.1**	**-**	**138.4**	**138.4**	**138.4**	**138.4**	**138.4**
Aerospace Research and Career Development	70.6	-	35.7	35.7	35.7	35.7	35.7
STEM Education and Accountability	0.0	-	94.4	94.2	93.8	93.4	92.9
Higher Ed. STEM Education	49.0	-	0.0	0.0	0.0	0.0	0.0
K-12 STEM Education	45.0	-	0.0	0.0	0.0	0.0	0.0
Informal STEM Education	15.5	-	0.0	0.0	0.0	0.0	0.0
ED Civil Service Labor And Expenses	0.0	-	8.3	8.5	8.9	9.3	9.8

Note:
For comparability purposes, the NASA Space Grant and Experimental Program to Stimulate Competitive Research (EPSCoR) FY 2010 funding is shown in the table above within the new Aerospace Research and Career Development Program line. All other past program content is reflected in the previous structure.

The FY 2011 appropriation for NASA was not enacted at the time that the FY 2012 Request was prepared; therefore, NASA is operating under a Continuing Resolution (P.L. 111-242, as amended). Amounts in the "Ann. CR FY 2011" column reflect the annualized level provided by the Continuing Resolution.

In accordance with the President's proposal to implement a five-year non-security discretionary spending freeze, budget figures shown for years after FY 2012 are notional and do not represent policy. Funding decisions will be made on a year-by-year basis.

In FY 2012 through FY 2016, civil service labor and expenses (CSLE) funds are administered within a single consolidated account in each of the appropriations, and not allocated within the program amounts shown above. The allocation to each program is reflected in the summary budget table included in the beginning of this budget request, which provides a full cost view. In FY 2010 and FY 2011, amounts are presented in full cost.

Relevance

Relevance to national priorities, relevant fields, and customer needs:

A strong U.S. economy is founded on the abilities, interests, and innovations of its citizens. However, the performance of American students on international assessments of STEM ability is "middle of the pack."* To improve the state of U.S. STEM education, the Federal Government is calling upon its agencies to help improve the STEM performance of American students.

NASA is committed to providing equal access to its education activities by providing any student with the opportunity to contribute to the future STEM workforce. NASA is responding by focusing its education investments on areas of greatest national need and ensuring that the Agency's education programs support national STEM priorities. With its wealth of science and technology content and its expansive network of education professionals, NASA is well equipped to address national needs such as meeting state requirements for educator professional development.

NASA provides practical experience and skills development for those who will become the future workforce through internships, fellowships, and student research opportunities. NASA is uniquely qualified to attract students to pursue STEM study and careers. It also is able to engage these future workers through inspiring NASA missions, fostering collaborative relationships between students and the current workforce and offering students opportunities to work in "out of this world" facilities. Hands-on challenges with expert mentors generate increased interest in undergraduate STEM study, thereby increasing the number of students who seek employment in aerospace or related STEM fields.**

*Programme for International Student Assessment, 2009
**Expanding Underrepresented Minority Participation: America's Science and Technology Talent at the Crossroads, The National Academies Press, 2011

Relevance to the NASA Mission and Strategic Goals:

By building a strong future workforce for NASA and the Nation, NASA's investments in STEM education address Strategic Goal 5, to "Enable program and institutional capabilities to conduct NASA's aeronautics and space activities."

By providing mission based experiences and learning resources, Education addresses strategic goal 6, to "Share NASA with the public, educators, and students to provide opportunities to participate in our mission, foster innovation and contribute to a strong national economy."

Relevance to education and public benefits:

In January 2011, President Barack Obama stated that, "over the next 10 years, nearly half of all new jobs will require education that goes beyond a high school education. And yet, as many as a quarter of our students aren't even finishing high school. The quality of our math and science education lags behind many other nations. America has fallen to ninth in the proportion of young people with a college degree. And so the question is whether all of us 'as citizens, and as parents' are willing to do what's necessary to give every child a chance to succeed." This speech echoes findings and calls-to-action by numerous committees, reports, professionals in education, and leaders in American industry. In response, the Department of Education has identified several strategies to improve STEM education and ways in which Federal agencies can contribute to the Nation's STEM improvement efforts. NASA is a strong contributor to the national plan.

NASA's education programs increase the number of students who are proficient in, choose to major in, and pursue careers in STEM fields. Improving STEM ability, increasing public scientific literacy, increasing the talent pool of future STEM workers, and developing the STEM skills of the future workforce are imperatives if the Nation is to remain globally competitive and sustain a strong economy. NASA actively works through mutually beneficial relationships with over 500 colleges and universities, hundreds of K-12 schools and districts, and over 400 museums and science centers to provide education experiences so that all students can learn deeply and think critically in STEM disciplines.

NASA supports cutting-edge undergraduate student research that contributes to NASA missions while training the next generation of scientists, engineers, and innovators. NASA targets recruitment and retention of underserved and underrepresented students, including women and girls, Hispanics, and students with disabilities.

Mission Directorate:	Education
Theme:	Education

Performance

Performance Commitments:

Measure #	Description	Contributing Program (s)
Strategic Goal 5	**Enable program and institutional capabilities to conduct NASA's aeronautics and space activities.**	
Outcome 5.1	**Identify, cultivate, and sustain a diverse workforce and inclusive work environment that is needed to conduct NASA missions.**	
Objective 5.1.2	**Provide opportunities and support systems that recruit, retain, and develop undergraduate and graduate students in STEM-related disciplines.**	
Performance Goal 5.1.2.1	***Assure that student participants in NASA higher education projects are representative of the diversity of the Nation.***	
APG 5.1.2.1: ED-12-1	Achieve 40 percent participation of underserved and underrepresented (in race and/or ethnicity) in NASA higher education projects.	STEM Education and Accountability
APG 5.1.2.1: ED-12-2	Achieve 45 percent participation of women in NASA higher education projects.	STEM Education and Accountability
Strategic Goal 6	**Share NASA with the public, educators, and students to provide opportunities to participate in our Mission, foster innovation and contribute to a strong national economy.**	
Outcome 6.1	**Improve retention of students in STEM disciplines by providing opportunities and activities along the full length of the education pipeline.**	
Objective 6.1.1	**Provide quality STEM curricular support resources and materials.**	
Performance Goal 6.1.1.1	***Provide educators nationwide with knowledge and tools with which to inspire students in STEM fields.***	
APG 6.1.1.1: ED-12-3	100,000 educators participate in NASA education programs.	STEM Education and Accountability
Objective 6.1.2	**Provide NASA experiences that inspire student interest and achievement in STEM disciplines.**	
Performance Goal 6.1.2.1	***Provide higher education students with authentic NASA mission-based opportunities that build knowledge and skills needed for STEM careers.***	
APG 6.1.2.1: ED-12-4	25,000 undergraduate and graduate students participate in NASA education opportunities.	STEM Education and Accountability
Performance Goal 6.1.2.2	***Provide elementary and secondary students with authentic NASA mission-based opportunities that build STEM knowledge, skills, and career awareness.***	
APG 6.1.2.2: ED-12-5	600,000 elementary and secondary students participate in NASA instructional and enrichment activities.	STEM Education and Accountability
APG 6.1.2.2: ED-12-6	85 percent of elementary and secondary students express interest in STEM careers following their involvement in NASA education programs.	STEM Education and Accountability

Mission Directorate:	Education
Theme:	Education

Performance

Performance Commitments:

Measure #	Description	Contributing Program (s)
Outcome 6.2	**Promote STEM literacy through strategic partnerships with formal and informal organizations.**	
Objective 6.2.1	**Develop NASA's leadership role in national STEM improvement efforts, as demonstrated by provision of meaningful educator professional development and student experiences, adoption of education technologies, and contributions to STEM education policies and strategies.**	
Performance Goal 6.2.1.1	***Provide educator professional development experiences and materials that align to needs and opportunities identified by districts, states, Department of Education, professional organizations, and other stakeholders.***	
APG 6.2.1.1: ED-12-7	5,000 educators use NASA resources in their curricula after participating in NASA professional development.	STEM Education and Accountability
Performance Goal 6.2.1.2	***Provide expertise in the development of STEM education policies and strategies.***	
APG 6.2.1.2: ED-12-8	Provide expertise to support the development of integrated science and engineering standards.	STEM Education and Accountability
Outcome 6.4	**Inform, engage, and inspire the public by sharing NASA's missions, challenges, and results.**	
Objective 6.4.1	**Use strategic partnerships with formal and informal educational organizations to provide NASA content to promote interest in STEM.**	
Performance Goal 6.4.1.1	***Leverage communities of practice to facilitate sharing of NASA successes and challenges with the public.***	
APG 6.4.1.1: ED-12-9	450 museums and science centers across the country actively engage the public in major NASA events.	STEM Education and Accountability

Performance Achievement Highlights:

In 2010, NASA chartered an EDT directed to develop a strategy for improving NASA's education offerings and to assist in establishing goals, structures processes, and evaluative techniques to implement new sustainable and innovative STEM education programs. The recommendations of the EDT are reflected in the FY 2012 education budget.

In FY 2010, nearly 21,000 Space Grant-supported undergraduate and graduate students participated in authentic hands-on research and engineering challenges, including developing and launching payloads on high altitude balloons, rockets, and other platforms.

In FY 2010, NASA piloted the SoI, engaging low-income and minority students in STEM disciplines through out-of-school learning activities. State education stakeholders, NASA Centers, and other education partners also offered STEM-related special events, educator professional development, and family activities.

During summer 2010, more than 150 events, led by NASA Centers and 130 participating partners from across the Nation, engaged over 150,000 students in NASA experiences. Of these, nearly 22,000 students received at least 40 hours of STEM engagement and instruction.

Of the 1,343 participants in NASA higher education activities, who self-reported post-employment data, 46.5 percent reported working for NASA, aerospace contractors, universities, or other educational institutions. Motivating Undergraduates in Science and Technology, or MUST, was a prototype for more closely mapping Office of Education investments to the NASA Early Career Hiring Initiative. This collaborative approach succeeded in placing 75.9 percent of MUST graduates with NASA.

In FY 2009 (reported in FY 2010), 6,743 higher education students self-reported being an underserved and underrepresented audience in terms of race/ethnicity. This represents 40.6 percent of the total number of higher education students served by NASA, an increase from 28 percent the previous year. Of all higher education students served by the Agency, 43 percent self-reported being women, a one-year increase from 41 percent. These figures are well above national averages for participation of minority students according to the National Science Foundation's report, "Women, Minorities, and Persons with Disabilities in Science and Engineering," released in April 2010.

In FY 2010, over 400 museums and science centers used NASA resources in their activities and exhibits. NASA selected some of these institutions to develop and implement public engagement activities to enhance education programs related to space exploration, aeronautics, space science, Earth science, and microgravity through the competitive program for science museums and planetariums.

NASA awarded 49 institutional research awards, worth more than $34.6 million, to targeted colleges and universities. This NASA-related research will better enable these institutions to compete for funding from sources other than NASA's Office of Education.

Mission Directorate:	Education
Theme:	Education

Independent Reviews:

Review Type	Performer	Last Review	Purpose/Outcome	Next Review
Quality	Abt Associates, Cambridge, MA	FY 2008	External independent evaluation of Science, Engineering, Mathematics, and Aerospace Academy, or SEMAA, included randomized controlled trials (RCT), assessed effectiveness, and determined how intended goals were being implemented. Evaluation considered the overall effort, provided data on how differences in effectiveness were associated with site variations, and offered explanations for observed outcomes. Evaluation was used to consider options for SEMAA to promote sustainability.	FY 2015
Other	Abt Associates, Cambridge, MA	FY 2009	The external evaluation contractor conducted a planning phase by reviewing selected investments in Higher Education. An evaluation design that includes multiple higher education activities and examines where NASA higher education graduates are employed after graduation was developed.	FY 2012
Relevance	Abt Associates, Cambridge, MA	FY2010	Based on the results of the planning phase, Abt will conduct a survey of graduates that have received NASA funding to find out where graduates are employed, as well as potential barriers to NASA graduates being employed in STEM fields. This evaluation is exploratory in nature and will help NASA better understand which types of investments are best at producing graduates that go into STEM fields.	FY 2014
All	Abt Associates, Cambridge, MA	FY 2010	The external evaluator conducted a planning phase for Informal Education. This included examining Informal and K-12 investments. The exercise found that activities that could be considered informal education, were sometimes categorized under K-12, and that the line between informal education and outreach was blurred. The results of this evaluation helped to inform the NASA EDT redesign of NASA education.	FY 2012
All	Abt Associates, Cambridge, MA	FY 2010	The external evaluator conducted a case study of five informal education activities. The case study looked at resources available, sustainability, developing strategic partnerships, and achievement of intended outcomes. Also included in the evaluation report were considerations for conducting a more rigorous impact study of informal education investments.	FY 2012
Relevance	Booz-Allen Hamilton (BAH)	FY 2009	An external independent evaluation of the NASA Explorer Schools (NES) was conducted by BAH, per Congressional direction. The evaluation included review of previous assessments and the NES redesign model. BAH identified several structural elements for NES scalability to a level that would support significantly greater numbers of schools, students and educators.	FY 2011

Mission Directorate:	Education
Theme:	Education

Independent Reviews:

Review Type	Performer	Last Review	Purpose/Outcome	Next Review
Relevance	Abt Associates, Cambridge, MA	FY 2010	The external evaluator is working closely with the NES team to develop a comprehensive formative evaluation for NES over the next two years. At the end, the evaluation contractor will conduct an outcome study. If the outcome study looks promising, the evaluator will conduct a rigorous study of NES impact, either an RCT or a well-designed quasi-experimental evaluation.	FY 2012
All	Abt Associates, Cambridge, MA	FY 2010	Contractor was tasked with conducting a formative evaluation of the SoI pilot. The evaluation report was used to inform the design of the second year of SoI.	FY 2011
Relevance	Booz-Allen Hamilton	FY 2010	Contractor assessed the SoI model and conducted a benchmarking study to inform the second year planning.	FY 2011
Relevance	Abt Associates, Cambridge, MA	FY 2011	Contractor is designing a formative evaluation for the second year of SoI.	FY 2012

Mission Directorate:	Education
Theme:	Education
Program:	Aerospace Research and Career Development

FY 2012 Budget Request

Budget Authority ($ millions)	FY 2010	Ann CR. FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016
FY 2012 President's Budget Request	**70.6**	**-**	**35.7**	**35.7**	**35.7**	**35.7**	**35.7**
NASA Space Grant	45.6	-	26.6	26.6	26.6	26.6	26.6
Experimental Program to Stimulate Competitive Research	25.0	-	9.1	9.1	9.1	9.1	9.1

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In accordance with the President's proposal to implement a five-year non-security discretionary spending freeze, budget figures shown for years after FY 2012 are notional and do not represent policy. Funding decisions will be made on a year-by-year basis.

In FY 2012 through FY 2016, civil service labor and expenses (CSLE) funds are administered within a single consolidated account in each of the appropriations, and not allocated within the project amounts shown above. The allocation to each project is reflected in the summary budget table included in the beginning of this budget request, which provides a full cost view. In FY 2010 and FY 2011, amounts are presented in full cost.

Mission Directorate:	Education
Theme:	Education
Program:	Aerospace Research and Career Development

Program Overview

Aerospace Research and Career Development strengthens the research capabilities of the Nation's colleges and universities and provides opportunities that attract and prepare increasing numbers of students for NASA-related careers. This program includes NASA's Space Grant and Experimental Program to Stimulate Competitive Research (EPSCoR). The research conducted through these programs contribute to the research needs of NASA's Mission Directorates and furthers the Nation's scientific and technology innovation agendas. Student programs serve as a major link in the pipeline for addressing NASA's human capital strategies. The programs build, sustain, and effectively deploy the skilled, knowledgeable, diverse, and high-performing workforce needed to meet the current and emerging needs of NASA and the Nation.

In doing so, NASA uses several strategies.

Research Infrastructure Development and Increasing Competitiveness: NASA supports the development of research and engineering competitiveness at minority colleges and universities, community colleges, and at institutions in states underrepresented in STEM research. Support includes research funding, support for new partnerships, access to NASA's unique facilities, and mentoring/research collaborations with NASA's scientists and engineers. Through new STEM courses, highly qualified faculty, new laboratories and research centers, and successful competition for NASA research, institutions are better able to attract and educate the future STEM workforce.

Internships and Fellowships: NASA provides research and training experiences to high school, undergraduate, and graduate students. Participants conduct engineering, science, and/or STEM education research that contributes to NASA's missions. Interns and fellows work at universities and at NASA Centers and benefit from the guidance and mentoring provided NASA's scientists and engineers. Opportunities to develop leadership skills and foster peer-to-peer interactions are important features of NASA's internships and fellowships.

Inspiring Students: NASA uses its unique resources, such as its flight and research facilities, to inspire student achievement in STEM. NASA provides mission-focused engineering challenges, contests, simulations, and learning activities that engage students both in and out of school. Work is conducted by NASA and in partnership with partners from industry, academia, other Federal agencies, and international partners. Inspiring students and instilling in them a desire to pursue STEM study is a major aim of the Administration's STEM education initiatives.

Mission Directorate:	Education
Theme:	Education
Program:	Aerospace Research and Career Development

Plans For FY 2012

In FY 2012, NASA will implement several activities through the Aerospace Research and Career Development Program:

- Prepare pre-college students for studies in STEM and increase the number of science and engineering graduates;

- Provide opportunities for student flight projects to access space. Through partnerships (e.g., NASA Centers, universities, and industry), students will gain research and hands-on engineering experiences on a variety of authentic flight platforms including high-altitude balloons, sounding rockets, aircraft, and space satellites;

- Strengthen STEM programs at the Nation's two-year community colleges--institutions that are critical to ensuring students are prepared for the workplace or to successfully transition to four-year institutions. Additionally, NASA will prepare graduating students from both two- and four-year institutions with skills, knowledge, and hands-on experiences in order to make them competitive when applying for employment with NASA, academia, or aerospace industries; and

- Engage in state and national level STEM education and employment-related policy discussions that improve and support national initiatives.

Project Descriptions and Explanation of Changes

National Space Grant College and Fellowship Program (Space Grant)

Space Grant is a national network that expands opportunities for students, educators, and faculty to understand and participate in NASA's aeronautics and space projects. Space Grant debuted in FY 1989, and it is now composed of 52 consortia in 50 states, the District of Columbia, and the Commonwealth of Puerto Rico. Space Grant leverages the resources of over 850 affiliates from universities, colleges, industry, museums, science centers, and state and local agencies. Space Grant supports and enhances science and engineering education and research efforts in higher education, K-12, and informal education. NASA establishes training grants with each consortium, aligning consortium work with the education priorities and the annual performance goals of the Agency.

Experimental Program to Stimulate Competitive Research (EPSCoR)

EPSCoR develops academic research enterprises that are long-term, self-sustaining, and nationally competitive by supporting states with modest research infrastructure so that they become more competitive in attracting non-EPSCoR funding. Funding is competitively awarded to lead academic institutions (in eligible states) to foster research and technology development opportunities for faculty and research teams. NASA actively seeks to integrate the research conducted by EPSCoR jurisdictions with the scientific and technical priorities being pursued by the Agency. These scientific and technical priorities are established and evaluated by the Agency's Office of the Chief Technologist and Mission Directorates. NASA's commitment to EPSCoR will be strengthened by closer alignment to the Agency's Space Technology Roadmaps.

Mission Directorate:	Education
Theme:	Education
Program:	Aerospace Research and Career Development

Program Management

The Associate Administrator (AA) for Education is responsible to the NASA Administrator for NASA's education investments. The AA for Education reports to the Administrator, serves as NASA Education Officer, and manages all education responsibilities.

Acquisition Strategy

NASA solicits new and innovative education products, tools, and services from qualified external organizations. This occurs in response to changes in STEM education trends, identified gaps or opportunities in the education portfolio of investments, a response to demonstrated customer need or demand, or when the Administration or Congress identifies new priorities.

NASA awards education grants and contracts through full and open competition. Selections are based on peer reviews by external panels that evaluate educational merit and internal/external panels for content, merit, feasibility, and alignment to education goals.

While competition may sometimes be restricted by legislation to designated participants, such as defined EPSCoR states, grant awards and selection of participating institutions are still determined competitively. When designated participants are identified, all proposals are reviewed for merit, and each award must be justified and deemed worthy of funding.

NASA has initiated an omnibus solicitation, similar to the Science Mission Directorate ROSES. In these calls for proposals, the needs of several projects and programs are combined in an overarching solicitation issued before NASA education funds are appropriated. Final selections are made and funded only when NASA receives its final budget. This process is expected to provide a greater response time for proposers and reviewers, which increases the quality and relevance of awarded work. In FY 2011, MUREP issued a ROSES-type call, "Education Opportunities in NASA STEM (EONS) 2011," which included competitive elements for several MUREP activities.

Mission Directorate:	Education
Theme:	Education
Program:	STEM Education and Accountability

FY 2012 Budget Request

Budget Authority ($ millions)	FY 2010	Ann CR. FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016
FY 2012 President's Budget Request	**0.0**	**-**	**94.4**	**94.2**	**93.8**	**93.4**	**92.9**
Minority University Research Education Program	0.0	-	28.0	28.0	28.0	28.0	28.0
STEM Education and Accountability Projects	0.0	-	66.4	66.2	65.8	65.4	64.9

Note:
The FY 2011 appropriation for NASA was not enacted at the time that the FY 2012 Request was prepared; therefore, NASA is operating under a Continuing Resolution (P.L. 111-242, as amended). Amounts in the "Ann. CR FY 2011" column reflect the annualized level provided by the Continuing Resolution.

In accordance with the President's proposal to implement a five-year non-security discretionary spending freeze, budget figures shown for years after FY 2012 are notional and do not represent policy. Funding decisions will be made on a year-by-year basis.

In FY 2012 through FY 2016, civil service labor and expenses (CSLE) funds are administered within a single consolidated account in each of the appropriations, and not allocated within the project amounts shown above. The allocation to each project is reflected in the summary budget table included in the beginning of this budget request, which provides a full cost view. In FY 2010 and FY 2011, amounts are presented in full cost.

Mission Directorate:	Education
Theme:	Education
Program:	STEM Education and Accountability

Program Overview

NASA uses information about Earth and its climate, the Moon, Mars, and beyond to engage educators and learners of all ages in various venues. The Office of Education works to align the NASA education strategy with national STEM priorities in collaboration with other Federal agencies and state and local education leaders. The new STEM Education and Accountability Program provides lessons, materials, research opportunities, and hands-on activities that draw on NASA's unique missions. This program includes projects that serve Higher Education, K-12 STEM Education, and Informal Education. This program also includes the Evaluation, Performance Monitoring, and Accountability project that improves the management, effectiveness, and efficiency of all education investments. NASA will execute its education plan by taking a balanced approach to providing services and opportunities to students, educators, higher education students, and the public. By executing this plan, NASA will provide many types of services and products.

Internships and Fellowships: NASA provides research and training experiences to high school, undergraduate, and graduate students. Participants conduct engineering, science, and/or STEM education research that contributes to NASA's missions. Interns and fellows work at universities and at NASA Centers, and benefit from the guidance and mentoring provided NASA's scientists and engineers. Opportunities to develop leadership skills and foster peer-to-peer interactions are important features of NASA's internships and fellowships.

Educator Professional Development: NASA builds STEM content capability in teachers by providing them with professional development opportunities. To meet state and local teacher continuing education requirements, these experiences are often offered in partnership with credit-granting colleges and universities. To improve teaching effectiveness, NASA uses proven approaches and strategies, including working with state and local education agencies, enabling interactions with NASA scientists and engineers, providing leadership development programs, and fostering between-peer sharing of best practices.

Inspiring Students: NASA uses its unique resources, such as its flight and research facilities, to inspire student achievement in STEM. NASA provides mission-focused engineering challenges, contests, simulations, and learning activities that engage students both in and out of school. Work is conducted by NASA and in partnership with industry, academia, other Federal agencies, and international partners. Inspiring students and instilling in them a desire to pursue STEM study is a major aim of the Administration's STEM education initiatives.

Curricular Support Resources and Materials: NASA provides a wide-variety of topic areas on which NASA creates and provides resources and materials to educators. Lesson plans, hands-on activities, and lesson enrichment materials (e.g., career Web sites and podcasts) are based on national standards, which are presented in formats and media designed for easy integration into established curricula. Education technologies (e.g., online games and professional development) enable scaled up delivery of NASA's materials to educator audiences with differing backgrounds, abilities, and interests. Provision of quality STEM materials is recommended by Department of Education as a strategy to improve STEM education.

Leveraging Partnerships: To inspire lifelong learning, NASA leverages strategic partnerships with industry, state and local agencies, museums and science centers, universities, and other community-based organizations. NASA builds and fosters networks of user communities that share information broadly, translate NASA's technical successes into audience appropriate exhibits and educational materials, and connect with peers in addressing STEM challenges.

Mission Directorate:	Education
Theme:	Education
Program:	STEM Education and Accountability

Plans For FY 2012

In FY 2012, NASA will implement several education activities.

1. Prepare pre-college students for studies in STEM and increase the number of science and engineering graduates.

2. Focus on educator in-service and pre-service professional development. Educators will use NASA's unique content to help prepare students for college study in STEM disciplines.

3. Provide opportunities for student flight projects to access space. Through partnerships (e.g., NASA Centers, universities, and industry), students will gain research and hands-on engineering experiences on a variety of authentic flight platforms, including high-altitude balloons, sounding rockets, aircraft, and space satellites.

4. Provide high school students with internship opportunities under mentorship of NASA scientists and engineers, and provide university students opportunities to participate in NASA space and aeronautics research missions. Fund institutions that make scholarships to students to support their studies and to help make college affordable. Some students will contribute to original research and support hardware designs that will fly on future NASA missions.

5. Enhance the capabilities of the formal and informal education community to inspire the next generation of explorers by providing access to NASA staff, research, technology, information, and/or facilities.

6. Immerse educators and students in current NASA science and technology by using social networks and Internet collaboration. NASA will make extensive use of e-education technologies, from Web-disseminated information and remote control of science instruments to learning in virtual worlds. Additionally, through NASA's digital infrastructure, the Agency will "beam" NASA scientists, engineers, and astronauts into classrooms, museums, and science centers across the Nation, providing real-time interactive discussion on topics related to NASA science and engineering.

7. Engage in state and national level STEM education policy discussions that improve and support education curricula development and/or support systemic reform initiatives.

Mission Directorate:	Education
Theme:	Education
Program:	STEM Education and Accountability

Project Descriptions and Explanation of Changes

Innovation in Education

NASA has taken a prominent role in supporting the Administration's education initiatives, including "Educate to Innovate" and public-private collaborations like National Lab Day. Through competitive cooperative agreements and partnerships with state-based consortia, companies, and nonprofits, NASA will continue to use its substantial STEM assets, including the Agency's scientists and engineers, to support improvements in STEM teaching and learning.

NASA's Innovation in Education project focuses on innovative ways to reach educators and students, improving student retention in STEM disciplines and better engaging community colleges and minority-serving institutions. It enables NASA to seek out and support innovative, replicable, and scalable approaches to improve STEM learning and instruction and to provide opportunities for students and faculty to participate in NASA-related research and launch vehicle/payload development activities. In collaboration with the ISS Program Office, students and faculty will develop new ISS hardware, conduct experiments, and identify new strategies for utilizing ISS data in learning activities. NASA will provide competitive opportunities for NASA partners to engage students in authentic hands-on learning opportunities through design challenges, competitions, and the SoI. NASA will identify and validate practices that can increase impact on STEM education and then replicate those that have proven effective. Collaborations between government, academia, and industry, such as those employed in the SoI, are encouraged as a means of engaging students in stimulating mathematics and science-based education.

Evaluation, Performance Monitoring, and Accountability

NASA supports the Administration's commitment to the public trust through transparency in operations and accountability in programmatic, financial, procurement, and reporting practices. NASA will establish an Evaluation, Performance Monitoring, and Accountability project. This project will assist education managers in setting specific outcome-focused performance goals, measuring progress toward meeting the goals, and tracking completion of key milestones. The project will compare progress among peers to identify better practices and recommend adopting and implementing strategies based on analysis of performance and other relevant data. Education managers will use performance data to confirm achievement of intended outcomes, make quick adjustments to strategies when data indicates investments are not performing, and report to the public in useful and accessible formats.

NASA recognizes the need to have ambitious goals, achieve results, ensure projects are well managed, and continuously improve efficiency. NASA will continue to cooperate with the Office of Management and Budget and internal/external stakeholders, to develop and address short-term, intermediate, and longer-term data and public reporting requirements.

Minority University Research and Education Project (MUREP)

NASA will continue to assist minority institutions and faculty through existing multi-year research grants and to provide scholarships, internships, mentoring, and tutoring to underserved and underrepresented students. In FY 2012, MUREP will increase investments supporting undergraduate students. This focus will enable greater numbers of underserved and underrepresented students to participate in NASA programs and continue to support the entry of these students into the scientific and technical workforce.

Formal and Informal Education

NASA's formal and informal education project supports educators and students in the classroom and in other education settings, like science centers, community-based organizations, or through an Internet presence. NASA partners with academic institutions, professional education associations, non-profits, industry, NASA visitor centers, and other Government agencies to provide teachers, faculty, and volunteers with the NASA experiences that they can use to spark students' interest in STEM fields. NASA invests in educator professional development, post-secondary STEM degrees, school-based resources, and multiple on-line learning activities. NASA resources and opportunities are available to all educators and students, and many investments have emphasis in attracting women, minorities, and persons with disabilities.

Program Commitments

Commitment/Output FY 2012	Program/Project	Changes from FY 2011 PB Request
Achieve 40 percent participation of underserved and underrepresented (in race and/or ethnicity) in NASA higher education projects.	STEM Education and Accountability	N/A
Achieve 45 percent participation of women in NASA higher education projects.	STEM Education and Accountability	N/A
100,000 educators participate in NASA education programs.	STEM Education and Accountability	N/A
25,000 undergraduate and graduate students participate in NASA education opportunities.	STEM Education and Accountability	N/A
600,000 elementary and secondary students participate in NASA instructional and enrichment activities.	STEM Education and Accountability	N/A
85 percent of elementary and secondary students express interest in STEM careers following their involvement in NASA education programs.	STEM Education and Accountability	N/A
5,000 educators use NASA resources in their curricula after participating in NASA professional development.	STEM Education and Accountability	N/A
Provide expertise to support the development of integrated science and engineering standards.	STEM Education and Accountability	N/A
450 museums and science centers across the country actively engage the public in major NASA events.	STEM Education and Accountability	N/A

Program Management

The AA for Education is responsible to the NASA Administrator for NASA's education investments. The AA for Education reports to the Administrator, serves as NASA Education Officer, and manages all education responsibilities.

Acquisition Strategy

NASA solicits new and innovative education products, tools, and services from qualified external organizations. This occurs in response to changes in STEM education trends, identified gaps or opportunities in the education portfolio of investments, a response to demonstrated customer need or demand, or when the Administration or Congress identifies new priorities.

NASA awards education grants and contracts through full and open competition. Selections are based on peer reviews by external panels that evaluate educational merit and internal/external panels for content, merit, feasibility, and alignment to education goals.

While competition may sometimes be restricted by legislation to designated participants, such as defined EPSCoR states, grant awards and selection of participating institutions are still determined competitively. When designated participants are identified, all proposals are reviewed for merit, and each award must be justified and deemed worthy of funding.

NASA has initiated an omnibus solicitation, similar to the Science Mission Directorate ROSES. In these calls for proposals, the needs of several projects and programs are combined in an overarching solicitation issued before NASA education funds are appropriated. Final selections are made and funded only when NASA receives its final budget. This process is expected to provide a greater response time for proposers and reviewers, which increases the quality and relevance of awarded work. In FY 2011, MUREP issued a ROSES-type call, "Education Opportunities in NASA STEM (EONS) 2011," which included competitive elements for several MUREP activities.

Mission Directorate:	Education
Theme:	Education
Program:	ED Civil Service Labor And Expenses

FY 2012 Budget Request

Budget Authority ($ millions)	FY 2010	Ann CR. FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016
FY 2012 President's Budget Request	**0.0**	**-**	**8.3**	**8.5**	**8.9**	**9.3**	**9.8**
ED Civil Service Labor and Expenses	0.0	-	8.3	8.5	8.9	9.3	9.8

Program Overview

This program contains labor funding, both salary and benefits, for civil service employees at NASA's Centers who are assigned to work on projects in the Education programs. These funds support the critical skills and capabilities required to support the education activities, as outlined in the other programs, within this Mission area.